INDEX

Volume 21 numbers 1–10 January/February—December 1989

SUBJECT INDEX

A

abstraction hierarchy 71

Advanced techniques for automatic finite element meshing from solid models 248

Advanced university courses in computer graphics 116

aircraft design 275

Al-based design versus geometry-based design or Why design cannot be supported by geometry alone 141

Algorithm for algebraic curve intersection 547
An assembly modelling system for dynamic and kinematic analysis 2

Application of a perspective cursor as a 3D locator device 619

Approximation results for the two-layer constrained-via-minimization problem 463

Architectural CAD: a ten year assessment of the state of the art 289

arcs 33

artificial intelligence 141, 315

assemblies 561 assembly modelling 2

automated reasoning 141

automated reasoning automatic placement 303

Automating physical system modelling using bond graphs 584

automobile design 259, 275

automobile styling 172

D

Ball-end cutter interference avoidance in NC machining of sculptured surfaces 371

Basic structure of a proposed building product model 71

Bernstein polynomials 194

Bézier curves 262

Bézier surface patches 194

Bézier surfaces 262

Bias and tension, two shape parameters for convenient specification of the parametric cubic segment 485

blend surfaces 165

blending 213

blending-function interpolation 555

bond graphs 584

BOOKS AND PUBLICATIONS

Adams, J A and Billow, L M Descriptive geometry and geometric modelling – a basis for design 127

Allen, J and Thomson Leighton, F (eds) Advanced research in VLSI 600

Ambler, T et al. Hardware accelerators for electrical CAD 657

Andreasen, M.M., Kahler, S., Lund, T and Swift, K

Design for assembly (2nd edn) 536

Barsky, B A Computer graphics and geometric modelling using beta-splines 186

Bartels, R H, Beathy, J C and Barsky, A An introduction to splines for use in computer graphics and geometric modeling 125

Bil, C Development and application of a computer-based system for conceptual aircraft design 657

Bono, P R and Herman, I (eds) GKS theory and practice 126

Brauer, J R (ed.) What every engineer should know about finite element analysis 124

Buehrens, C VersaCAD: a practical approach to computer-aided design 658

Bushnell, M L Design automation 535

Carrol, J and Tanner, P P (eds) Human factors in computer systems – IV and graphics interface 57

Chiyokura, H Solid modelling with Designbase: theory and implementation 598

Cox, J, Hartley, P and Walton, D Keyguide to information sources in CAD/CAM 405 Coyne, R Logic models of design 659

Earnshaw, R A Workstations and publication systems 187

Earnshaw, R (ed.) Theoretical foundations of computer graphics and CAD 596

Farin, G Curves and surfaces for computer-aided geometric design 597 Gerber, R (ed.) Circuit theory and design

Gero, J (ed.) Expert systems in computer-aided

Holden, A Knowledge based CAD and microelectronics 471

IEEE 24th ACM/IEEE Design Automation Conference Proceedings 1987 126

Majchrzak, A, Chang, T-C, Barfield, W, Eberts, R and Salvendy, G Human aspects of computer-aided design 405

Mantyla, M An introduction to solid modelling 470

Maver, T and Wagter, H (eds) CAAD futures '87, Proceedings of the second international conference on computer aided architectural design futures 658

Murthy, T K S and Fielding, J P Computer applications in aircraft design and operation 189

Naish, P and Bishop, P Designing ASICs 600 Nutbourne, A W and Martin, R R Differential geometry applied to curve and surface design. Volume 1: foundations 57

Pham, D J (ed.) Expert systems in engineering 469 **Plander, 1 (ed.)** Artificial intelligence and information-control systems of robots – 1987 188

Qiulin, D and Davies, B J Surface engineering geometry for computer-aided design and manufacture 124

Ramamoorty, M Computer-aided design of electrical equipment 406

Reghbati, K H and Lee, A Y C Tutorial: Computer graphics hardware, image generation and display 660

Salmon, R and Slater, M Computer graphics – systems and concepts 60

Stan Wei, C Developing three-dimensional CAD software with the IBM PC 128

Strasser, W Advances in computer graphics hardware 1 60

Szymankiewicz, J, McDonald, J and Turner, K Solving business problems by simulation 535

Weatherall, A Computer-integrated manufacturing: from fundamentals to implementation 536

Winiarski, M Projektowanie Wspomagane Komputerem Monographia 657

Yoshikawa, H and Warman, E A (eds) Design theory for CAD 598

Boolean algebra over linear polyhedra 474 Boolean operations on polyhedra 410 boundary representation 355 Building a feature-based object description from a boundary model 641 building design 71, 79, 289, 497, 519, 589

building design 71, 79, 289, 497, 519, 58 8-splines 262, 293, 509, 538, 641

CAD for control systems: a review of mainframe and workstation software 54

CAE/CAD/CAM curricula implementation – experience at the National University of Singapore 649

centripetal model 363

Changes in understanding of CAD/CAM: a database-oriented approach 309

channel routing 151 Choosing nodes in parametric curve interpolation 363

CIM databases 379 circuit design 25, 102, 338

circuit partitioning 447, 611 circuit simulation 303

closed loops 505 Common language for multilateral communication between different CADCAM

drawing databases 630 'Competing' channel router 151

Index

industrial facilities 49 Computer aids for electronic equipment design Efficient algorithm for graph-partitioning Inertial properties of tapered cylinders and 21 years on 338 problem using a problem transformation computer graphics 619 method 611 partial volumes of revolution 456 Computer-aided discretization and elastic joints 435 Initial work on a system-independent computer simplification of continuous control electronic design automation 25, 66, 102, 151, model of a 3D anthropomorphic dummy 393 303, 338, 346, 447, 463, 611 input devices 619 systems 239 Computer-aided mechanical engineering: 1958 element extraction algorithms 248 Integrated approach to finite element analysis to 1988 275 ellipses 33 of advanced composite structures 441 Computer-aided modelling and simulation of engineering 275, 297 intelligent control 141 Enhanced heuristic for multichannel Interactive analysis of vibration modes using mechanisms and manipulators 577 Computer-aided vehicle styling 172 optimization in gate array layout 66 approximation algorithms and computer computer-integrated manufacture 309 Exchange of solid models: current state and graphics 430 cones of revolution 404 future trends 87 interface standards 467 expert systems 79, 248, 519 Constant-radius blending in surface intersection of natural quadrics 201 modelling 213 Constrained B-spline curve and surface fitting 641 feature recognition 602 joint information 2 Constrained via minimization for three-layer Features of a specialized CADCAM system for routing 346 the manufacture of decorative effects on constrained-via-minimization problem 463 buildings 589 Key developments in computer-aided construction 289 filleting 213 geometric design 262 constructive solid geometry 157, 221 finite element analysis 441 kinematic analysis 2 continuity conditions 194 finite element meshing 248 knowledge representation 141 continuous control systems 239 finite elements 555 Knowledge-based system approach to building First steps of CAD 259 control systems 54 envelope design 519 controller synthesis 232 flexible manufacturing systems 182 knowledge-based systems 79, 315 Convex polyhedral chains: a representation for form features 602 geometric data 157 frequency-domain optimization 239 Coons patches 262, 293 laminates 441 corner blend surfaces 213 layout of gate arrays 66 courses 116, 649 gate arrays 66 layout optimization 107 Covering of polygons by rectangles 97 GC1 continuity conditions between adjacent line integrals 456 line segment intersection 410 Cross product of cones of revolution 404 rectangular and triangular Bezier surface curve fitting 262 curve interpolation 262 local updating 221 patches 194 Generating blend surfaces using partial logic simulation 25 curve modelling 262 curves 293, 509, 547, 641 Looking at GKS 254 differential equations 165 lumped parameter models 584 Geometric computing and uniform grid technique 410 geometric continuity 194, 293 data exchange 630 geometric design 371, 641 manufacture 49, 297, 309, 589 Geometric method of intersecting natural data interfaces 87 Manufacturing model: an integrated approach data mangement 157 quadrics represented in trimmed surface to planning, design and managing industrial data representation 130, 561 form 201 facilities 49 marching 505 data storage 654 geometric modelling 130, 141, 221, 259, 355, databases 309, 379, 630 mechanical engineering 275 485 decision making 519 GKS 254 mechanisms 577 Gordon surfaces 262, 293 microwave amplifiers 102 decomposition of polygons 97 graph contractability 346 decorative effects 589 mode shape approximation 430 Deriving shape functions for triangular Graphical representation of design optimization model reduction 239 mid-edge finite elements through processes 21 modelling 577, 584 blending-function interpolation 555 graphics 38, 430, 619 Models of production systems 182 Design and stochastic simulation of elastically graphics standards 254, 467, 654 Modifying the shape of rational B-splines, jointed mechanical systems 435 graph-partitioning problem 611 Part 1: curves 509 design calculations 21 Modifying the shape of rational B-splines. Part 2: surfaces 538 Design of an automated assembly haloed lines 410 environment 561 modular boundary models 602 Design of microwave transistor amplifiers 102 hardware accelerators 447 multichannel optimization 66 Design of nonlinear PID controllers using multivariable curve interpolation 262 Hessian curves 547 hidden-line removal 570 system step response 232 design support systems 141 Hierarchical octree approximations for developable surfaces 13 boundary representation-based geometric natural quadrics 201 Development of reduced time interval models 355 NC machining 371 human-machine interaction 393 partitioned simulation algorithm 25 neutral file languages 87 Difference method for generation of circular Newton-Raphson procedure 21 HVAC systems 79 hybrid edge 130 arcs and ellipses 33 Nonlinear programming approach to direct display algorithm 221 Hybrid shadow testing scheme for ray automated topology optimization 107 discretization 239 tracing 38 nonlinear systems 232 numerical control 259 domain triangulation algorithms 248 dynamic analysis 2 dynamic simulation language 584 IGES 87, 630

Improved test for closed loops in surface

Incremental display of CSG models using local

intersections 505

updating 221

edge blend surfaces 213

education 116

object-oriented models 71

Opening windows 467

optimization 21, 107

octrees 355

Parallel circuit partitioning on a reduced array architecture 447 parallel computational geometry 410 parametric cubic segments 485 parametric curve interpolation 363 partial differential equations 165 patches 262 pattern recognition 97 PDES 87 physical systems 584 PID controllers 232 plant design 49 ply properties 441 polar curves 547 polygon decomposition 97 polyhedral chains 157 polyhedral visibility 410 process planning 602 product models 71 production systems 182

Q quadrics 201 queueing models 182

Raise your standards 120
RATAS project 71
rational B-splines 509, 538
ray tracing 38, 497
rectangles 97
rectangular Bézier surface patches 194
recursive spatial decomposition algorithms 248
recursive subdivision 570
reduced array architecture 447

reflection 497
relational databases 379
Relaxation methods in CAD 303
Removal of hidden lines by recursive subdivision 570
Representation and deformation of developable surfaces 13
Review of CAD/CAM 297
robot programming 379
rolling-ball blends 213
rounding 213
routing 151, 346, 463

S scanline visible-surface algorithms 221
Select-HVAC: knowledge-based system as an advisor to configure HVAC systems 79
shadow testing 38
shadowing 497
shape generation 33
ship design 275
simulation 577
simulation of logic 25
solid modelling 87, 157, 172, 221, 248, 474, 528
Solutions of tangential surface and curve intersections 421
split edge model 130
SR: a PC-based CAD system for shadow and reflection studies in the built

environment 497 standards 120, 254, 467, 654 STEP 87, 630 1 stochastic simulation 435 Storing pictures for different purposes 654 structural design 21 surface fitting 262
surface modelling 13, 213, 262, 421, 538
surface patches 194
surface representation 165
surfaces 293, 371, 505, 538, 641
surface—surface intersection 201

Tangential intersections 421
The hybrid edge: a topological data structure for vertically integrated geometric modelling 130 topology 107
Toward intelligent CAD systems 315
Trends in curve and surface design 293 triangular Bézier surface patches 194

uniform grid 410

Using conventional and nested relational database systems for modelling CIM data 379

V vehicle design 172
vertically integrated models 130

via minimization 346 vibration modes 430 visualization 172 VLSI cell placement 611 VLSI design 346, 447 volume of revolution 456 Voxel-based methods for CAD 528

W windows 467 winged edge model 130 winged-triangle representation 474

AUTHOR INDEX

A
Akman, V, Franklin, W R, Kankanhalli, M and
Narayanaswami, C Geometric computing
and uniform grid technique 410

Al-Assadi, S A K Computer-aided discretization and simplification of continuous control systems 239

Atherton, D P CAD for control systems: a review of mainframe and workstation software 54

Baden Fuller, A J see Runham, M Baker, P Integrated approach to finite element analysis of advanced composite structures 441 Banerjee, P see Roy, U

Barrett, R Computer aids for electronic equipment design – 21 years on 338 Bernard, J E see Vance, J M Bézier, P First steps of CAD 259

Bjork, B-C Basic structure of a proposed building product model 71

Bloor, M I G and Wilson, M J Generating blend surfaces using partial differential equations 165

Blount, G N see Okey, R E **Brandli, N and Mittelstaedt, M** Exchange of solid

models: current state and future trends 87
Bronsvoort, W F and Garnaat, H Incremental display of CSG models using local updating 221

Brown, A D and Stockley, E W Relaxation methods in CAD 303

Bruzzone, E see De Floriani, L

Burns, S. A. Graphical representation of design optimization processes 21

Burton, R P Advanced university courses in computer graphics 116

Chang, K E, Iyu, H F and Feng, W S

Constrained via minimization for three-layer

routing 346

Cheng, F and Lin, I-M Covering of polygons by rectangles 97

Choi, B K and Ju, S Y Constant-radius blending in surface modelling 213 Choi, B K and Jun, C S Ball-end cutter

Choi, B K and Jun, C S Ball-end cutter interference avoidance in NC machining of sculptured surfaces 371 Christiansen, H N see Sederberg, T W

Christiansen, H N see Sederberg, T W

Culbreth, D N Manufacturing model: an
integrated approach to planning, design and
managing industrial facilities 49

De Floriani, L and Bruzzone, E Building a feature-based object description from a boundary model 602

de Montaudouin, Y Cross product of cones of revolution 404 Deb, K see Wilson, H

Dooner, M Models of production systems 182
Dürr, M, Huck, M, Kemper, A, Mohrholz, P and
Wallrath, M Using conventional and nested

relational database systems for modelling CIM data 379

E Eastman, C M Architectural CAD: a ten year assessment of the state of the art 289 Elliott, W S Computer-aided mechanical engineering: 1958 to 1988 275 Eo, K S and Kyung, C M Hybrid shadow testing scheme for ray tracing 38

Fanghella, P, Galletti, C and Giannotti, E.

Computer-aided modelling and simulation of mechanisms and manipulators 577

Fair C Transit in curve and existing 2023.

Farin, G Trends in curve and surface design 293
Fazio, P, Bedard, C and Gowri, K
Knowledge-based system approach to

building envelope design 519

Fazio, P, Zmeureanu, R and Kowalski, A
Select-HVAC: knowledge-based system as an advisor to configure HVAC systems 79

Feng, W S see Chang, K E Fog, N G see Rogers, D F Franklin, W R see Akman, V

Galletti, C see Fanghella, P
Garnaat, H see Bronsvoort, W F
Giannotti, E see Fanghella, P
Griffiths, J G see Maghrabi, S M
Gunther, O and Wong, E Convex polyhedral
chains: a representation for geometric
data 157

Guoqing, C and Yiqun, Y 'Competing' channel

Haglin, D J and Venkatesan, S M

Approximation results for the two-layer constrained-via-minimization problem 463 Hang, C C see Nee, A Y C

Ho-Le, K Deriving shape functions for triangular mid-edge finite elements through blending-function interpolation 555

Hood, S J, Palmer, E R and Withers, D H Automating physical system modelling using bond graphs 584

Hog, N see Nassirharand, A Hoschek, J see Liu, D Huck, M see Durr, M

Imam, M H and Mir, M Nonlinear programming approach to automated topology optimization 107

Jense, G J Voxel-based methods for CAD 528 Ju, S Y see Choi, B K

Julien, C and Laborie, M Bias and tension, two shape parameters for convenient specification of the parametric cubic segment 485

Jun, C S see Choi, B K Iyu, H F see Chang, K E

Kalay, Y E The hybrid edge: a topological data structure for vertically integrated geometric modelling 130

Kang, S and Szygenda, S A Development of reduced time interval partitioned simulation algorithm 25

Kankanhalli, M see Akman, V Katz, S see Sederberg, T W

Kela, A Hierarchical octree approximations for boundary representation-based geometric models 355

Kemper, A see Durr, M Kim, M see Lee, C-H

Kim, S H and Lee, K An assembly modelling system for dynamic and kinematic analysis 2

Kowalski, A see Fazio, P Kyung, C M see Eo, K S

Laborie, M see Julien, C Lang-Lendorff, G and Unterburg, J Changes in understanding of CAD/CAM: a database-oriented approach 309

Lee, C-H, Park, C-I and Kim, M Efficient algorithm for graph-partitioning problem using a problem transformation method 611

Lee, E T Y Choosing nodes in parametric curve interpolation 363

Lee, K see Kim, S H Lin, I-M see Cheng, F

Lin, L, Sahni, S and Shragowitz, E Enhanced heuristic for multichannel optimization in gate array layout 66 Liu, C R see Roy, U

Liu, D and Hoschek, J GC1 continuity conditions between adjacent rectangular and triangular Bézier surface patches 194 Llewelyn, A I Review of CAD/CAM 297

Magedson, R L see Markot, R P

Maghrabi, S M and Griffiths, J G Removal of hidden lines by recursive subdivision 570

Markot, R P and Magedson, R L Solutions of tangential surface and curve intersections 421

Mir, M see Imam, M H

Mittelstaedt, M see Brandli, N

Mohrholz, P see Durr, M

Mumford, A M Storing pictures for different purposes 654

Murahashi, Y see Yamamoto, Y

Narayanaswami, C see Akman, V Nassirharand, A, Hoq, N and Tzou, H S Design of nonlinear PID controllers using system step response 232

Nassirharand, A see also Tzou, H S Nee, A Y C and Hang, C C CAE/CAD/CAM curricula implementation - experience at the National University of Singapore 649

Ohsuga, \$ Toward intelligent CAD systems 315 Okey, R E, Suffell, C and Blount, G N Initial work on a system-independent computer model of a 3D anthropomorphic dummy 393 Owen, J see Roy, G G

Palmer, E R see Hood, S J

Paoluzzi, A, Ramella, M and Santarelli, A Boolean algebra over linear polyhedra 474 Park, C-I see Lee, C-H

Patnaik, L M see Ravikumar, C P Perucchio, R see Sapidis, N

Piegl, L Geometric method of intersecting natural quadrics represented in trimmed surface form 201

Piegl, L Key developments in computer-aided geometric design 262

Piegl, L Modifying the shape of rational B-splines. Part 1: curves 509

Piegl, L Modifying the shape of rational B-splines. Part 2: surfaces 538

Ramella, M see Paoluzzi, A

Ravikumar, C P, Sastry, S and Patnaik, L M Parallel circuit partitioning on a reduced array architecture 447

Redont, P Representation and deformation of developable surfaces 13

Rogers, D F and Fog, N G Constrained B-spline curve and surface fitting 641 Rong, Y see Tzou, H S

Roy, G G and Owen, J SR: a PC-based CAD system for shadow and reflection studies in the built environment 497

Roy, U, Banerjee, P and Liu, C R Design of an automated assembly environment 561

Runham, M and Baden Fuller, A J Design of microwave transistor amplifiers 102

Sahni, S see Lin, L Santarelli, A see Paoluzzi, A

Sapidis, N and Perucchio, R Advanced techniques for automatic finite element meshing from solid models 248

Sastry, S see Ravikumar, C P

Sederberg, T W Algorithm for algebraic curve intersection 547

Sederberg, T W, Christiansen, H N and Katz, S Improved test for closed loops in surface intersections 505

Semple, E C Features of a specialized CADCAM system for the manufacture of decorative effects on buildings 589

Shragowitz, E see Lin, L

Smithers, T Al-based design versus geometry-based design or Why design cannot be supported by geometry alone 141

Sparks, M R Looking at GKS 254 Sparks, M R Opening windows 467

Sparks, M R Raise your standards 120

Stockley, E W see Brown, A D Suffell, C see Okey, R E

Szygenda, S A see Kang, S

Tovey, M Computer-aided vehicle styling 172 Tzou, H S, Rong, Y and Nassirharand, A Design and stochastic simulation of elastically jointed mechanical systems 435 Tzou, H S see also Nassirharand, A

Unterburg, J see Lang-Lendorff, G

van Overveld, C W A M Application of a perspective cursor as a 3D locator device 619 Vance, J M and Bernard, J E Interactive analysis

of vibration modes using approximation algorithms and computer graphics 430 Venkatesan, S M see Haglin, D J

Wallrath, M see Durr, M Wang, C Y see Wang, W P

Wang, W P and Wang, C Y Difference method for generation of circular arcs and ellipses 33

Wilson, H and Deb, K Inertial properties of tapered cylinders and partial volumes of revolution 456

Wilson, M J see Bloor, M I G Withers, D H see Hood, S J

Wong, E see Gunther, O

Yamamoto, Y and Murahashi, Y Common language for multilateral communication between different CADCAM drawing databases 630

Yiqun, Y see Guoqing, C

Zmeureanu, R see Fazio, P

